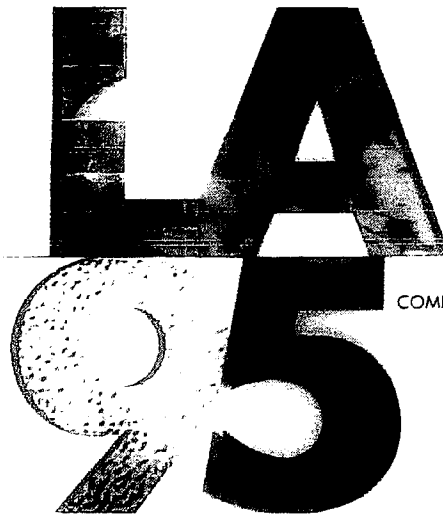# EXHIBIT 30

The Art and Interdisciplinary Programs of SIGGRAPH 95

LA 95

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visual proceeding

visual proceedings

The Art and Interdisciplinary Programs of SIGGRAPH 95

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VISUAL PROCEEDINGS

The Art and Interdisciplinary Programs
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Annual Conference Series, 1995

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GRAPHICSNET

MAGIC GIGABIT TESTBED

The MAGIC project comprises three principal components: an interactive terrain visualization application (TerraVision), a high-speed distributed image storage system (ISS), and a high-speed internetwork to link the computing resources.

TerraVision allows a user to view and navigate through a landscape based on high-resolution aerial and satellite imagery. Locations of vehicles (for example, from training exercises) can be super-imposed on the view of the terrain and updated in real time. The ISS, which stores, organizes, and retrieves the processed images and elevation data required by TerraVision, consists of multiple coordinated data servers distributed around a wide-area network.

The MAGIC internetwork consists of several LANs interconnected by a wide-area ATM over SONET backbone. The network provides trunk speeds of 2.4 Gbps and access speeds of 155 and 622 Mbps.

Interactive, real-time, data-intensive applications like TerraVision and distributed storage systems resembling the ISS will become more common as high-speed networks become the norm. The developers of the MAGIC project are exploring some of the challenges introduced by such systems and developing technology that will foster widespread deployment in the future.

MAGIC is an ARPA-funded collaboration of the EROS Data Center, Lawrence Berkeley Laboratory, the Minnesota Supercomputer Center, SRI International, the University of Kansas, MITRE, Sprint, USWest, Southwest Bell, Northern Telecom, and Splitrock Telecommunications

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TerraVision and the ISS Cooperate to Visualize Landscape
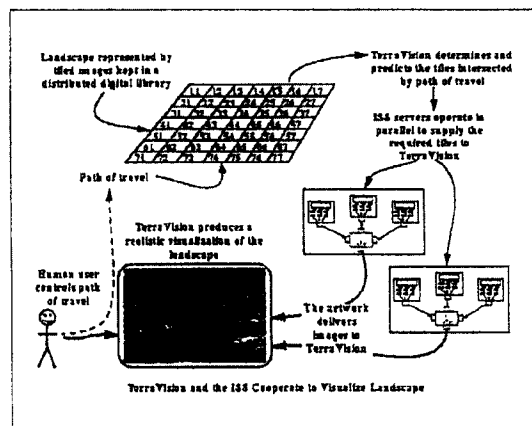
T_Vision is a broad-band application research project. It provides a distributed virtual globe as a multimedia interface to visualize any kind of data related to a geographic region. The virtual globe is modeled from high-resolution spatial data and textured with high-resolution satellite images

A T_Vision database and real-time rendering system has been developed to handle this huge amount of data. Seamless links between different levels of detail allow continuous zooming from a global view down to recognizable features of only a few centimeters in size. The virtual globe can display many types of data, including biological, sociological, economical, and others.

This project is based on the concept of a transparent and worldwide broad-band, networked topography and surface data bank. Because it is impossible for a single location to store and maintain the huge amount of high-resolution data necessary for such a visualization application, the system automatically establishes an ATM connection to the server that provides the most up-to-date and highest-resolution data required for the current field of view (and visualization layer). These remotely accessed data are integrated unobtrusively into the user's system on the fly. A special T_Vision user interface based on a large real globe ("earth-tracker") facilitates the user's navigation around the virtual globe, so the user has full control over which information to

view, when, and at which location.

A successful ATM T_Vision test network between Tokyo and Berlin was established in October 1994. A third node will be added this year, in Sunnyvale, California USA.

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Special Thanks
Hans Hueber, Hero Ischibashi, Joerg Jacobs, Rolf Kruse, Uli Lipka, Dirk Luesebrink, Gert Monath, Dieter Sachse, Erick Schmitz, Andreas Schneider, Christoph Stratmann, Susi Traeger, Henrik Tramberend and the rest of ART+COM.

T_Vision is funded by DeteBerkon, Berlin and supported by Wethernews Inc. Tokyo.